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# Thirteen years of sea turtle conservation in South Thailand: are we avoiding extinction?

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## ABSTRACT

The island of Phra Thong located in Phang-Nga province, South Thailand, was chosen as base for the Sea Turtle Conservation Project (STCP) because of its central geographical position along the Andaman Sea coast. The STCP started in 1996 in collaboration with the Phuket Marine Biological Center and focused on two different aspects: 1. scientific research and conservation; 2. educational program in the local schools and raising awareness amongst tourists.

1. Data collected over 13 years of activities of the STCP about the reproductive biology of sea turtles (olive ridley, leatherback and green turtle) shows a stable trend compared to the drastic decline recorded in the previous decade. The 2004 tsunami resulted in many changes that probably affected the nesting behavior in the area, to the extent that sea turtles have changed their preference of nesting sites on the island. Conservation strategies to preserve the species, such as egg relocation, are successfully applied as are community involvement and awareness. The average hatchling success of olive ridley ranged between 71 and 95%.

2. The STCP is now based within a small local community, where an environmental education center is set up.

Although one of the main threats, egg poaching, has nearly been eliminated through education activities in the local communities, there is still a need to decrease the threats from fishing activities and tourism development. A study on the possible impact of artisanal fisheries showed that squid cages can easily catch juvenile sea turtles.

**KEYWORDS:** sea turtle conservation, Andaman coast Thailand, extinction, community involvement

## INTRODUCTION

The island of Phra Thong located in Phang-Nga province, South Thailand, was chosen as base for the Sea Turtle Conservation Project (STCP) because of its central geographical position along the Andaman Sea coast. The STCP started in 1996 in collaboration with the Phuket Marine Biological Center and focused on different aspects: scientific research and conservation, an environmental education program in the local schools and conservation awareness.

Over the past 13 years many volunteers from different countries have helped in collecting valuable information, applying conservation strategies and conducting education and awareness activities. On 26th December 2004 the project was completely washed away. Our little museum, the volunteer huts, instruments, turtle tank, etc., were lost to the Andaman Sea. However, this is a material loss and nowhere near comparable to the loss of two members of Naucrates staff working on the island

that day. After the tsunami, the Naucrates Conservation project continued to focus on beach monitoring, nest protection, education and community involvement.

In this paper, a review of the results of the project, of the impact of the tsunami and remaining possible threats to sea turtles in the region are presented.

## Beach Monitoring

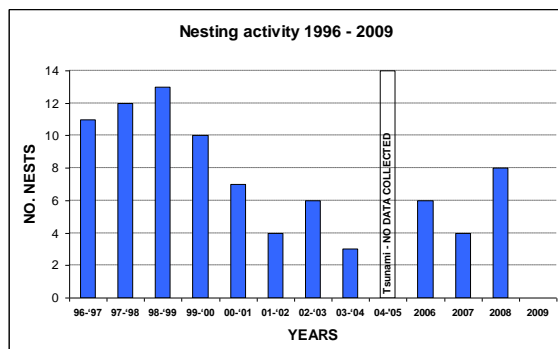
Morning monitoring surveys were conducted daily on Phra Thong island and periodically on Ra and Kho Khao island from December to April of each year from 1996 to 2009. Work began at 5.30 am before tracks were erased by human activity or weather conditions (wind, rain etc.). Surveys were carried out by a minimum of two people.

Data were collected in relation to the number of nests and no-nesting tracks found and species of turtle: nests were identified and marked and their position recorded using GPS. Distance between egg chamber and vegetation was recorded. Egg

chambers were covered and a hole next to it was dug in order to mislead any eventual egg poachers. Nests were relocated when eggs were found in an area at risk of poaching or inundation from the sea. Nest sites were checked daily for sign of predation, disturbance or hatching. During hatching volunteers ensured that all the hatchlings progressed safely to the ocean. Nest excavations were carried out on the third day following the first signs of hatchling emergence. Data were gathered on hatching success through the number of empty shells, size of developing embryo in relation to yolk sac and the number of dead hatchlings.

### 1996 – 2009 nesting activity

On Phra Thong, Ra and Kho Khao islands the total number of nests laid each year (with the exception of the season 2004-05 when the tsunami occurred and monitoring was not conducted) varied between 0 and 14 nests from 1996 to 2009 (Fig.1). Regular nests belong to the olive ridley turtle (*Lepidochelys olivacea*), with the leatherback (*Dermochelys coriacea*) and green turtle (*Chelonia mydas*) nesting less frequently (Aureggi and Chantrapornsy, 2006).



**Fig. 1** Nesting activity at Phra Thong, Ra and Kho Khao islands, 1996-2009. Data included nests belonging to olive ridley turtle, green turtle and leatherback turtle. Monitoring was not conducted during the season 04 - 05 because the tsunami badly hit the project.

The drastic decline of nests along the south west coast of Thailand indicates that only a few nesting females have survived in the area. The absence of any emergence in 2009 represented a significant drop in nesting effort from previous seasons (since the beginning of the monitoring project) when up to 14 nests were observed. However this cannot be viewed as indicating a permanent decline, given the periodicity with which turtles nest and the fact that in 2009 unusual weather conditions were recorded. Cool sea and air temperature in January, sudden variations in sea current and blooming of jelly fish were all unusual events that could be related to an

impact of climate change in the area.

It was thought that moving the eggs from the nest site to a safe, protected location on the beaches of Phra Thong island would have been a successful conservation strategy, since egg poaching is considered to be one of the main causes of decline. The high hatching success recorded during the project indicated that eggs were moved carefully enough to obtain the same rate of success (71 – 95%) as recorded with natural hatching along the West coast of Thailand in the past (Phasuk and Rongmaungsart, 1973). In fact, the manner in which nests were moved was in an attempt to emulate the natural nesting area as much as possible and training was given by an expert to volunteers and local people in order to avoid any unnecessary interference with the incubation of newly laid eggs (Aureggi and Chantrapornsy, 2006).

### Post tsunami observations related with sea turtles

The beach physiognomy changed after the devastating tsunami of 26 December 2004. Beaches were markedly eroded and small lagoons are now located behind sand dunes. Part of the beaches that were narrow and not used by turtles before the tsunami are now larger and used by turtles. Beach reforestation programs have changed the natural aspect of the nesting habitat. *Casuarina* trees are now commonly found along shores.

### Sea turtle feeding behavior

During the 2006 season, there were many sightings of juvenile sea turtles (*Chelonia mydas* and *Eretmochelys imbricata*) from “Hornbill Hill” (09°07.577N-098°14.981E), a small rocky hill situated on the west coast of Koh Phra Thong. It is 16 meters high facing the Andaman Sea. The area of water where sightings occurred has a mixed rocky and sandy substrate and is occasionally used by fisherman with fishing and squid cages. During the 2006 season a dead green turtle was found in a fishing cage (Aureggi, 2006). During the following seasons (2007-2008-2009) the hill has been used as an observation point and data on sea turtles sightings has been regularly collected.

Even though the data is insufficient to draw a proper conclusion, sightings of turtles in the area correlate with the food source available underwater. Sightings occurred more often in March than in January and February. Further investigation and analysis is required.

### Sea Turtle mortality

A total of 13 dead turtles (3 *Chelonia mydas*, 1 *Caretta caretta*, 2 *Dermochelys coriacea*, 4 *Eretmochelys imbricata*, 3 *Lepidochelys olivacea*) have been recorded in the survey area during the 13

years of the program although it is likely that other fatalities have occurred. Evidence of entanglement in fishing gear and of turtle exploitation by human was found.

A study on the interaction between turtle and artisanal fisheries showed that in the past, the capture of juvenile turtles in squid or fish traps was rarely reported (Tsaros and Aureggi, 2007). However, since the tsunami, there has been a case of a green juvenile being caught in a fish trap, which was recorded by the Naucrates team in 2006 (Aureggi, 2006). Fish and squid traps should be studied and modified to allow fish to enter but not turtles. Squid traps, the most common type of fishing gear, can potentially catch turtles. There are several factors which contribute to this concern. The trap stays at sea overnight, with fresh bait, which can attract turtles. The opening (35-40 cm) could allow a young turtle to enter and become trapped. This opening should be reduced to minimize by-catch without reducing the amount of squid caught in the trap (Tsaros and Aureggi, 2007).

The continuing increase in the number of trawlers has forced the local fishermen to modify their fishing areas as well as affecting their productivity. Local fishermen blame the trawlers not only for damaging a lot of their cages, but also for turtle by-catch (Tsaros and Aureggi, 2007). More research should be conducted on boats that use trawl nets and long lines, using both direct and indirect research methods, to evaluate their impact on the sea turtle population nesting or feeding near the study area.

The research to date indicates that some fishing zones coincide with feeding grounds used by sea turtles (Tsaros and Aureggi, 2008).

Further research and collaboration with fishermen and national agencies is necessary to form a comprehensive overview of the situation. It is important to determine possible changes to juvenile green turtle feeding grounds, especially since the tsunami. The pre-tsunami feeding grounds might need time to rebuild or new feeding grounds may be identified. This year some fishermen reported that different types of gear such as pound nets were used in areas where juveniles were spotted (Tsaros and Aureggi, 2008). Pound nets are used to trap fish and may also trap turtles. This would apply to areas between the island and the mainland and should be investigated.

In 2007 a notable increase in the number of larger squid boats and trawlers was recorded (Tsaros and Aureggi, 2007). In 2008, at least 10 trawlers and squid boats were recorded while out fishing confirming serious threats to the juvenile population, which is the future of a sea turtle population (Tsaros and Aureggi, 2008).

The brighter side of this study comes from the villagers of Phra Thong. The attitudes of the younger fishermen have confirmed the general achievement of the Naucrates' environmental education program over the last decade. This new generation of fishermen is concerned about environmental issues and is willing to help. They should be encouraged to get involved in the conservation effort.

#### **Environmental Education and Visitor Center**

An Environmental Education and Visitors Center was opened at Lion Village (LV) in January 2008 at Phra Thong Island. LV was rebuilt after the tsunami as part of the relief effort that aimed to provide home to local people that lost houses during the tsunami in 2004. Lion International provided Naucrates with two houses in February 2008, with the intent of continuing the conservation project in the village, of involving the local community in creating a sustainable development program and of providing environmental education in the local school. The houses are used as centers for lessons for the children, meeting with villagers, training/educational sessions and talks.

#### **Environmental Education Programme (EEP)**

The EEP is a part of the Naucrates Conservation Project on Phra Thong Island. Aside from the EEP, a number of English lessons was included in the work plan to help the locals improve their English skills. The objectives of the EEP are, firstly, to help the students understand the necessity of protecting the natural resource of the area, especially of marine and coastal environments; secondly, to introduce the idea of conservation and sustainable use of resources; thirdly, to continue the Mangrove Rehabilitation Program; and lastly, to raise the students', locals' as well as tourists' environmental awareness.

The aims of the English lessons are to improve the locals' English skills and provide the participants the opportunity to exchange experiences culturally.

#### **Community programme**

A collaborative project between Naucrates and the Mangrove Action Project (MAP) is carried out in Lion Village at Phra Thong Island. The project aim is to provide support to the community by building capacity and awareness. Environmental management activities are organized in order to introduce environmental friendly ways of living and increasing the environmental capacity of the villagers. A "green" area in the village will be created by planting native trees. A homestay project will be organized and a plan for marketing will be set up. In addition, conservation activities for and

with villagers will be organized, likewise an environmental education program for the school children and village youth will be established.

## **CONCLUSIONS AND RECOMMENDATIONS**

Sea turtles represent an endangered species in the Andaman Sea. Even though their number has dramatically decreased in the area, any existing conservation efforts should continue and new efforts should begin in order to keep the nesting population stable and alive. Monitoring is the main activity that allows the collection of information about the status of the presence of this endangered species in the area. As the Naucrates project is now working closely with and for the local community, the young generation might become the future managing group of their natural resources including turtles.

Tourism development and fisheries still remain the main threats on the island of Phra Thong. More studies are needed to estimate the impact of trawlers on sea turtle population. Recently, the impact of climate change is believed to contribute to the threats to sea turtles at Phra Thong.

Environmental education is thought to be the solution to educate and increase environmental capacity and awareness in the local village.

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